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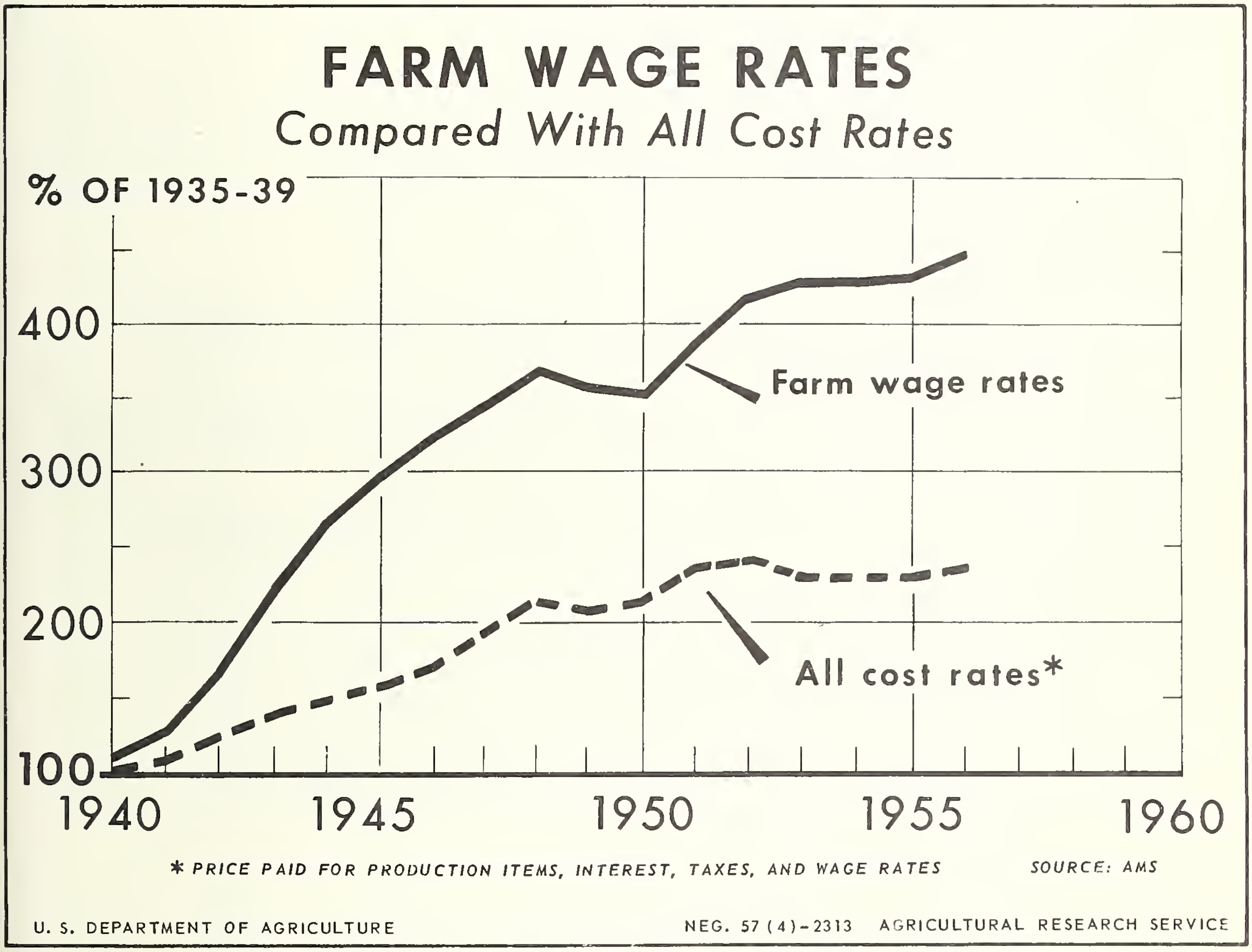
~~1957 OUTLOOK ISSUE~~
FOR RELEASE May 22, P. M.

THE FARM COST SITUATION

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

ARS 43-52 (FCS-22) MAY 1957



FARM WAGE RATES
Compared With All Cost Rates

* PRICE PAID FOR PRODUCTION ITEMS, INTEREST, TAXES, AND WAGE RATES SOURCE: AMS

U. S. DEPARTMENT OF AGRICULTURE NEG. 57 (4)-2313 AGRICULTURAL RESEARCH SERVICE

Since 1940, farm wage rates have advanced more than the index of all cost rates. Except for the years from 1948 to 1950, the rise has been continuous. Farm ~~cost~~ wage rates were about 4-1/2 times as high in 1956 as they were in 1935-39.

Goods and services used in production: Index numbers of cost rates and prices paid by farmers, United States

(1947-49=100)

Year or period	Commodities, interest, taxes, and wage rates	Commodities only	Feed	Livestock	Motor supplies	Motor vehicles	Farm machinery	Farm supplies	Building and fencing materials	Ferti-lizer	Seed	Wage rates
1910-14	39	42	43	29	---	---	42	42	34	70	41	23
1915-19	59	63	68	44	---	---	54	70	48	101	62	34
1920-24	65	61	60	33	---	---	65	77	57	101	60	42
1925-29	65	61	58	44	94	49	64	73	54	92	60	43
1930-34	50	47	39	25	74	49	61	61	47	75	40	28
1935-39	49	52	45	36	74	56	64	60	49	71	49	28
1940	49	52	43	41	71	56	64	62	49	69	42	30
1941	53	55	47	46	74	59	65	66	53	69	40	35
1942	60	62	57	54	79	64	69	73	58	76	54	46
1943	68	69	68	61	81	67	71	82	60	81	68	61
1944	73	73	75	58	82	73	73	86	64	83	77	74
1945	77	74	74	63	82	75	74	87	66	84	79	83
1946	83	81	87	72	84	77	76	88	72	85	81	90
1947	95	95	102	90	92	90	86	95	93	93	93	97
1948	104	105	109	111	103	100	101	100	104	102	109	103
1949	101	100	89	99	105	110	113	105	103	105	98	100
1950	104	104	91	116	106	110	115	105	105	101	94	99
1951	115	115	102	141	111	118	124	112	117	106	96	109
1952	117	116	109	118	112	123	129	119	118	109	109	117
1953	112	106	98	83	114	122	130	120	118	110	100	119
1954	112	106	98	85	116	123	131	117	119	108	93	119
1955	112	105	92	84	117	126	132	114	122	107	102	120
July	112	105	91	81	---	124	---	---	---	---	---	119
Aug.	111	104	89	80	---	---	---	---	---	---	---	---
Sept.	111	104	87	81	116	126	134	113	123	106	94	---
Oct.	111	104	87	82	---	---	---	---	---	---	---	120
Nov.	111	103	86	77	---	129	---	---	---	---	---	---
Dec.	111	103	87	72	116	130	135	114	124	---	---	---
1956	114	105	89	78	119	131	138	117	127	105	86	125
Jan.	112	104	87	78	---	129	---	---	---	---	---	121
Feb.	112	103	87	78	---	---	---	---	---	---	85	---
Mar.	112	104	87	79	117	130	136	117	125	---	85	---
Apr.	114	105	88	81	---	---	---	117	---	105	86	125
May	115	105	91	81	---	---	---	---	---	---	86	---
June	114	105	90	76	118	130	138	117	127	---	---	---
July	113	105	90	76	---	130	---	---	---	---	---	124
Aug.	114	105	91	79	---	---	---	---	---	---	---	---
Sept.	115	106	91	80	120	131	141	117	128	106	90	---
Oct.	115	105	89	78	---	---	---	---	---	---	---	128
Nov.	116	106	90	78	---	136	---	---	---	---	---	---
Dec.	115	106	91	73	121	138	141	122	129	---	---	---
1957												
Jan.	117	108	91	79	---	138	---	---	---	---	---	129
Feb.	118	108	91	80	---	---	---	---	---	---	91	---
Mar.	118	109	90	86	123	139	143	120	130	---	91	---
Apr.	119	110	90	90	---	---	---	121	---	105	89	131

Agricultural Marketing Service.

THE FARM COST SITUATION

Approved by the Outlook and Situation Board, May 10, 1957

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GENERAL SITUATION

Prices paid by farmers for goods and services used in production are about 5 percent higher this spring than they were a year ago. Fertilizer is the only important farm-production cost item that has not had a net increase in price in the last year. Interest rates on new loans are substantially higher.

Cost rates and prices paid by farmers for major groups of production items this spring compared with a year earlier are as follows:

Feeder livestock (April 15)	Up	11	percent
Farm real estate (March 1)	Up	7	"
Motor vehicles (March 15)	Up	7	"
Motor supplies (March 15)	Up	5	"
Farm machinery (March 15)	Up	5	"
Farm real estate taxes per acre	Up	5	"
Farm supplies (April 15)	Up	4	"
Seed (April 15)	Up	4	"
Wage rates (April 1)	Up	4	"
Building and fencing materials (March 15)	Up	3	"
Feed (April 15)	Up	2	"
Fertilizer (April 15)	No change		

Farmers' production cost rates in general have more than doubled since 1940 but some have increased more than others. Farm wage rates, for example, have risen by more than 300 percent, whereas prices of fertilizer and gasoline have advanced about 53 and 64 percent, respectively. The cost of electricity per kilowatt-hour has declined about 25 percent since 1940.

Farm Capital Investment

Total investment in farm buildings, machinery, and equipment was less in 1956 than in any year since 1947. However, the amount invested was apparently sufficient to offset depreciation charges. From 1946 to 1956, farmers spent about $45 billion on major improvements and additions to plant and equipment. This was about $14 billion more than the estimated $31 billion required to cover depreciation. The investment of $14 billion in excess of depreciation for the period 1946-56 compares with a deficit of about $2 billion for the period 1930-45.

Production Cost-Price Relationship

Farm cost rates this spring are slightly higher in relation to prices received than they were a year ago. The present relationship is about equal to the average relationship that prevailed in 1935-39 and during the 20-year period immediately preceding World War II. It is substantially less favorable to farmers, however, than it was during World War II and for nearly 10 years thereafter. Cost rates, as measured by the index of production goods, interest, taxes, and wage rates, are about 37 percent higher now than they were 10 years ago but prices received by farmers are about the same as they were then.

Production Efficiency

Although the relationship between farm cost rates and farm commodity prices was about the same in 1956 as it was in 1940, farmers as well as others have benefited from the increased efficiency of modern production methods and the more complete utilization of the labor force. On hog-dairy farms in the Corn Belt, for example, cost rates and prices paid for goods and services used in production were 14 percent higher in 1956 than in 1947-49 but cost per unit of production on these farms was only 3 percent above the 1947-49 level in 1956.

Many farmers have increased their incomes by adopting more efficient methods. They have increased the size of their farms and their use of nonfarm goods and services, such as machinery, fertilizer, and electricity. Total farm output has continued to increase, however, and this has had a depressing effect on farm commodity prices and farmers' incomes. During World War II, farm incomes increased faster than nonfarm incomes, but since 1946, real incomes of farmers have declined while real incomes of most other groups have continued to rise.

Special Articles

Several special articles are included in this issue of The Farm Cost Situation to provide a better understanding of the changes farmers have made that have brought about an increase of about 11 percent in annual farm output since 1951. This increase in farm output was achieved without an increase in land under cultivation and despite a 9-percent reduction in the labor force.

It stems from the use of more fertilizer, more pesticides, more and better seed, more irrigation, better drainage, better design and arrangement of service buildings, increased mechanization, and many other things.

The aspects of the situation that have been analyzed in considerable detail in previous issues (such as the effect of increased use of fertilizer on output and per-unit cost of production) are covered briefly in this report so that more space may be devoted to the economics of farm size, irrigation, and farm service buildings.

FARM LABOR

This spring, farmers in all parts of the country are paying higher rates for hired workers than they paid a year ago. The increase ranges from 2 percent in the Mountain States to 6 percent in New England (table 1). The average rise over the whole country amounted to 4.5 percent. This is a slightly greater increase than occurred from April 1955 to April 1956.

As of April 1, farmers in the Pacific States were paying higher average rates for hired workers than in other regions. Wages per month with board and room averaged $194 in these States, compared with $128 for the country as a whole. Hourly rates without board and room averaged $1.15 on the Pacific Coast as compared with 92 cents for the country as a whole.

Table 1.- Average farm wage rates, April 1, 1957, compared with rates on April 1, 1956, by regions

Region	Average wage rates, April 1, 1957 1/			Increases, 1956 to 1957
	With board and room, per month	Without board or room		
		Per day	Per hour	
	Dollars	Dollars	Dollars	Percent
New England	144	9.00	1.11	6.0
Middle Atlantic	131	8.30	1.05	5.2
East North Central	131	8.20	1.05	4.5
West North Central	130	8.20	1.00	3.1
South Atlantic	2/	5.40	.70	4.4
East South Central	2/	4.30	.59	4.4
West South Central	2/	5.60	.70	3.6
Mountain	158	8.20	.97	2.2
Pacific	194	2/	1.15	3.4
United States	128	5.60	.92	4.5

1/ Selected from 9 types of rates for which averages are reported.
2/ Relatively unimportant in this region.

From the monthly report, Farm Labor, prepared by the Agricultural Marketing Service, U. S. Department of Agriculture.

Competition from nonfarm employers is a big factor in the regional differential in farm wage rates. During January and February of this year, earnings of factory workers in the United States averaged $2.05 per hour. This rate represents a 6.2-percent rise from the same period in 1956. Wage rates in industry have increased more than farm wage rates during the last year and also over the longer pull. In 1956, wage rates of production workers in manufacturing establishments were about 50 percent higher than in 1947-49. During the same period, farm wage rates rose only half as much on a percentage basis.

Farm wages paid on a piece-rate basis are not included in the data in table 1. Almost two-fifths of the hired workers were paid piece rates in the fall of 1954, according to the U. S. Census of Agriculture. Although the proportion paid by this method is higher in the fall than in other seasons, a significant proportion of hired workers are paid in this way throughout the year.

Farm wages paid on a piece-rate basis apparently have been going through a period of readjustment during the last few years. Picking cotton is the only job for which piece rates are available on a national basis. Rates for this job rose steadily from about 60 cents per 100 pounds of seed cotton for the years just prior to World War II to $3.05 per hundredweight in 1952. Since then the average picking rate has decreased, while hourly rates for other types of work have continued to rise. Last fall, cotton pickers were paid an average of $2.65 per 100 pounds, or 10 cents less than during the 1955 season. As yields of cotton have increased and as more cotton can be picked in higher yielding fields, the earnings of cotton pickers have been more favorable than is indicated by the picking rate. The Bureau of Employment Security, Department of Labor, collects data on piece rates as part of the foreign worker program. Rates paid for many jobs, in addition to cotton picking, are included. These data also indicate that piece rates have not kept pace with the increase in time rates.

As has been true for the last several years, the supply of experienced regular farmworkers continues to be tight. However, the need for farm labor will be less this year. About 17 percent of the 1957 national cotton allotment has been signed up under the soil bank program. Assuming that the noncommitted portion of the allotment will be planted and that average abandonment will occur, there will be about 10 percent fewer acres of cotton to pick next fall than in 1956. The acreage of tobacco, another heavy user of labor, is expected to be about 17 percent less this year than a year ago.

The need for workers for other crops and in other areas will not go down as much, and in some instances may actually increase. The prospective acreage of sugar beets, for example, is almost 10 percent higher than in 1956. Workers from foreign sources will be available for seasonal farm jobs in areas certified as having an insufficient supply of labor from domestic sources.

FARM POWER AND MACHINERY

Retail prices of farm machinery and motor vehicles were 5 and 7 percent higher, respectively, in mid-March than they were a year earlier. Both wholesale and retail prices are now at peak levels. Wholesale prices of farm machinery, including tractors, were quite stable from 1926 to 1945, but they have since increased by about 80 percent.

Current retail prices, which reflect costs of attachments and accessories as well as the basic unit, are now more than 100 percent above prewar levels. Modern tractors, other motor vehicles, and many farm machines are now generally equipped with attachments and accessories that were not available on the earlier models.

Since 1951, supplies of practically all kinds of farm equipment have been adequate to meet demand, and many dealers, especially those in drought areas, have sold machines and equipment below list prices, either by giving large discounts for cash purchases, or by allowing more than the market value for "trade-ins."

Farmers' purchases of tractors and other farm machinery have been relatively large in volume since 1940, except in 1943 when output was greatly restricted. In 1951, production of farm machinery was at a peak level. For machinery and equipment other than tractors, automobiles, and motortrucks, the estimated value on farms adjusted for price changes increased in most years from 1940 to 1955 (table 2). The total increase for the 15-year period was about 170 percent. However, because of the relatively low volume of purchases of farm machinery and equipment in 1956, preliminary indications are that the estimated value on January 1, 1957, was about 4 percent less than a year earlier.

The value of farm tractors, automobiles and motortrucks, adjusted for price changes, declined during the World War II period when production of tractors and other motor vehicles was restricted.

The number of horses and mules on farms is now less than 15 percent of the 1918 number. Annual reductions in numbers, which have approximated 10 percent, can be expected to continue, as the colt crops of recent years have been too small to maintain more than about half the present horse and mule numbers.

Numbers of tractors, motortrucks, and most of the principal farm machines are now estimated to be at record levels. Farmers tend to keep their old machines until replacements are obtained. In 1956, purchases of new machines, including tractors, were relatively small. Preliminary estimates indicate that the numbers of machines purchased exceeded the numbers discarded. In recent years, purchases of large tractors and large machines in general have been relatively well maintained. This tendency can be expected to continue in the immediate years ahead, as many farmers find that

Table 2.- Power and machinery on farms, index numbers, United States, January 1, 1940-57

(1947-49 = 100)

Year	Number 1/						Value in constant dollars	
	Horses and mules all ages	Work-stock 3 years old and over	Colts under 1 year of age	Tractors 2/	Auto-mobiles	Motor-trucks	Machinery and equipment other than tractors and other motor vehicles	Tractors, automobiles and motortrucks
1940	156	144	324	54	97	55	61	83
1941	152	140	314	58	101	58	62	87
1942	147	136	272	65	109	61	68	102
1943	142	134	221	72	101	68	70	90
1944	136	130	198	76	98	73	68	78
1945	128	125	172	83	97	79	73	73
1946	119	117	133	87	99	82	81	72
1947	109	108	112	92	101	90	85	79
1948	100	100	100	99	99	101	98	98
1949	91	92	88	109	100	109	116	123
1950	84	85	74	119	98	117	130	153
1951	76	77	62	129	98	122	141	173
1952	66	67	54	137	99	128	153	187
1953	58	59	49	144	99	133	159	185
1954	51	52	46	149	99	138	161	194
1955	46	47	43	152	99	143	163	194
1956 3/	43	43	43	156	99	148	163	194
1957 3/	38	38	41	159	99	153	156	189

1/ The 1947-49 average for horses and mules of all ages was 9,302,000; for workstock, 8,492,000; for colts, 233,000; for tractors, 2,852,000; for automobiles, 4,288,000; and for motortrucks, 1,888,000.

2/ Excludes garden tractors.

3/ Preliminary.

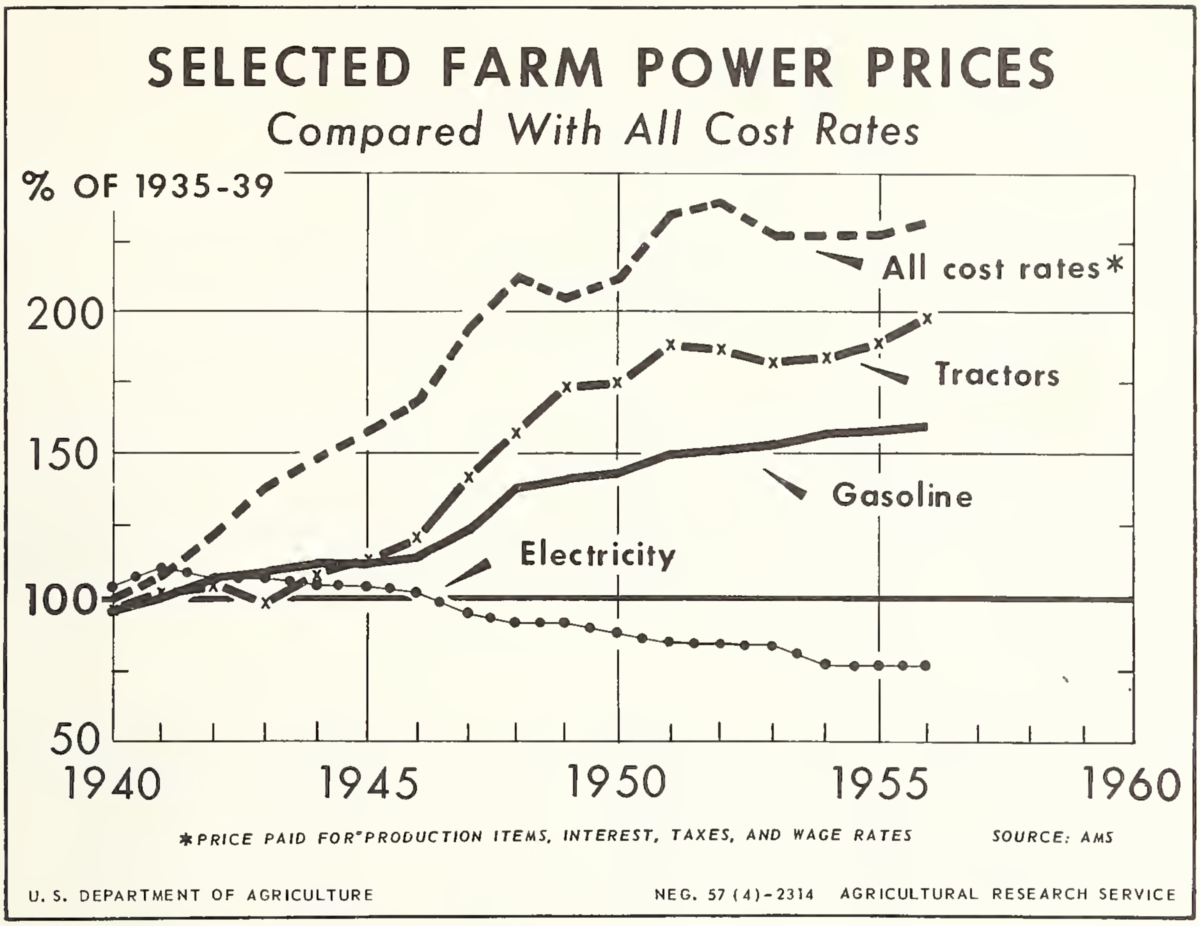

Figure 1

the larger machines make for increased savings in labor and timeliness in performing farmwork, and that they contribute to lower costs of production on the larger farms.

Since 1940, prices of tractors and gasoline have increased less than the index of all cost rates, while the cost of electricity per kilowatt-hour has actually declined (fig. 1).

FEED

Prices received by farmers for feed grains and hay on April 15 were down about 2 percent from a year earlier, but prices paid by farmers for feed were up 2 percent (table 3). Prices of corn and soybean meal were lower, but prices of most other feeds were higher. Corn prices will probably average lower this spring and summer than in the same period of 1956 when prices rose about 15 percent. The price of high-protein feeds will probably be more stable this spring than a year ago when the price increased substantially in the spring.

Returns per $1.00 of feed cost on the basis of April 15 prices are higher than a year earlier for all livestock enterprises, except poultry and butterfat dairy enterprises (table 4). Returns from hogs, sheep, and beef

Table 3.- Average prices of feed in the United States, April 15, 1957, with comparisons

Item and unit	Apr. 15, 1955	Apr. 15, 1956	Oct. 15, 1956	Apr. 15, 1957	
				Actual	As a percentage of Apr. 15, 1956
	Dollars	Dollars	Dollars	Dollars	Percent
Prices received by farmers:					
Corn, per bu.	1.36	1.32	1.19	1.21	92
Oats, per bu.	.73	.62	.69	.71	115
Barley, per bu.	1.07	.95	.98	.98	103
Sorghum grain, per 100 lbs.	2.23	1.93	2.07	2.04	106
Hay, baled, per ton	22.40	21.10	21.50	21.10	100
Prices paid by farmers:					
Mixed dairy feed, 16 pct. protein, per 100 lbs.	3.79	3.62	3.66	3.78	104
Laying mash, per 100 lbs.	4.70	4.42	4.49	4.48	101
Broiler mash, per 100 lbs.	5.13	4.91	4.97	4.95	101
Cottonseed meal, per 100 lbs.	4.26	3.65	3.78	3.82	105
Soybean meal, per 100 lbs.	4.49	3.92	3.87	3.77	96
Linseed meal, per 100 lbs.	4.56	4.16	4.13	4.12	99
Meat scrap, per 100 lbs.	5.11	4.45	5.03	4.66	105
Bran, per 100 lbs.	3.08	3.02	2.88	3.08	102
Middlings, per 100 lbs.	3.24	3.10	3.03	3.12	101
Alfalfa hay, baled, per ton	35.40	32.50	33.20	33.40	103
Average value of concentrate ration fed to poultry and milk cows: 1/					
Fed to poultry, per 100 lbs.	3.73	3.51	3.53	3.54	101
Fed to milk cows, in milk-selling areas, per 100 lbs.	3.27	3.02	3.05	3.12	103
Fed to milk cows, in cream-selling areas, per 100 lbs.	2.87	2.63	2.65	2.77	105
	Index numbers 1947-49 = 100				
Prices received by farmers for feed grains and hay	86	80	77	78	98
Prices paid by farmers for feed	95	88	89	90	102

1/ Value of the corn, oats, oilmeal, millfeed, commercial mixed feed, etc., that make up 100 pounds of "grain" ration.

Table 4.- Returns per $1.00 of feed cost for livestock enterprises, United States, April 15, 1957, with comparisons 1/

Livestock enterprise or product	1937-51 average April	April 15, 1955	April 15, 1956	October 15, 1956	April 15, 1957
	Dollars	Dollars	Dollars	Dollars	Dollars
Eggs	1.48	1.37	1.57	1.54	1.24
Broilers	1.63	1.84	1.39	1.18	1.29
Turkeys	1.75	1.68	1.85	1.54	1.60
Milk	1.83	1.67	1.83	2.11	1.87
Butterfat	1.49	1.25	1.36	1.32	1.31
Hogs	1.57	1.50	1.34	1.60	1.77
Sheep raising	1.60	1.33	1.28	1.28	1.52
Beef raising	1.76	1.55	1.46	1.53	1.70
		(1954-55)	(1955-56)		(1956-57)
Cattle feeding	2/1.25	1.19	1.15		3/
	Index numbers (1937-51 = 100)				
Eggs	100	93	106	74	84
Broilers	100	113	85	73	79
Turkeys	100	96	106	83	91
Milk	100	91	100	94	102
Butterfat	100	84	91	75	87
Hogs	100	96	85	91	113
Sheep raising	100	83	80	76	95
Beef raising	100	88	83	84	97
		(1954-55)	(1955-56)		(1956-57)
Cattle feeding	100	95	92		3/

1/ Quantities of feed used in calculating the cost of feed for recent years follow: Per dozen eggs - 7 lbs. poultry ration; per lb. of broiler - 3 lbs. broiler mash; per lb. of turkey - 4-3/4 lbs. poultry ration; per 100 lbs. of hogs - 7-1/2 bu. corn plus 20 lbs. soybean meal; per 100 lbs. of milk - 31 lbs. concentrate ration fed to milk cows in milk-selling areas plus the value of 110 lbs. hay; per lb. of butterfat - 7-1/2 lbs. concentrate ration fed to milk cows in cream-selling areas plus the value of 27-1/2 lbs. hay in Minnesota and Iowa; per 100 lbs. of beef cattle - 3 bu. corn plus 600 lbs. hay; per 100 lbs. of sheep and lambs - 2 bu. corn plus 1,500 lbs. hay. Assumed 19 lbs. wool produced for each 100 lbs. sheep and lamb produced. Quantity of hay for milk cows, beef cattle, and sheep includes an allowance for silage and pasture. Feed nutrients from pasture assumed to cost one-fourth as much as nutrients from hay. Cattle feeding returns are based on table 2, Livestock and Meat Situation, AMS, August 17, 1956, which is based on Corn Belt experience.

2/ 1920-52 average.

3/ Season not completed.

raising are up substantially from 1956 and returns from cattle feeding for 1956-57 are expected to average higher when the season is over than in 1955-56. Returns per $1.00 of feed cost from eggs, broilers, turkeys, and butterfat are less than a year earlier and below the long-term average but have improved somewhat since last fall. Prices of cattle and hogs on April 15 were higher than a year earlier. Butterfat, milk, and wool were also higher, but prices of eggs, broilers, and turkeys were lower. The index of prices of livestock and livestock products, which includes poultry, was about 7 percent above April 15, 1956.

The combined stocks of four principal feed grains on January 1 were 4 million tons above a year earlier, and set a new record. The production of oilseed meals has been running ahead of a year ago for the first half of the year beginning October 1, 1956, and the total quantity fed in the full year will probably be at least 5 percent larger than the 9.2 million tons fed in 1955-56.

The number of grain-consuming animal units in the current feeding year (October 1 to September 30) is down 1½ percent from a year earlier. Nearly all of the decrease stems from a 4-percent decrease in the number of hogs. The number of beef cattle on feed on April 1 was up about 4 percent from a year ago. On January 1, the number of other beef cattle, including beef cows, was down, the number of dairy cattle was little changed, and the number of stock sheep was a little lower compared with last year. There were more hens and pullets on farms on January 1 than a year earlier, but a much smaller number of chickens for replacement is expected to be raised. An increase in production of commercial broilers and turkeys is expected this year.

The number of roughage-consuming animal units in the current feeding year is down about 2 percent from a year ago. The decrease is mainly in numbers of beef cattle, especially in the States most affected by drought during the last year.

SEED

Retail prices of field seeds were generally higher in mid-April than they were a year earlier. The overall index of seed prices was up about 4 percent. Prices of individual seeds were as much as 60 percent higher for timothy and bromegrass; 30 percent higher for common alfalfa, alsike clover, and Korean lespedeza; 20 percent higher for Kentucky bluegrass, orchardgrass, and Sudangrass; 10 percent higher for red clover and seed oats; and 5 percent higher for cottonseed and seed barley.

Hybrid seed corn and soybeans were among the items for which prices in mid-April were about the same or slightly lower than a year earlier. Prices of Ladino clover and Irish seed potatoes were lower by 7 and 22 percent, respectively.

FERTILIZER

The index of prices paid for fertilizer this spring is unchanged from a year earlier. Prices of most fertilizers are slightly higher, but prices of nitrogen fertilizer are somewhat lower.

The decline in prices of nitrogen fertilizers stems chiefly from the greatly expanded capacity for producing synthetic nitrogen. Although extensive drought and the soil bank program have tended to limit further increases in demand for fertilizer, there is no indication that the demand has subsided to any appreciable extent.

Fertilizer is a better buy today than it was in 1940. Prices received for farm products are more than twice as high as they were then. The index of prices paid by farmers for fertilizer is 53 percent higher than it was in 1940 (fig. 2).

As a rule, the newer fertilizers contain more plant nutrients per ton than the older fertilizers. Since 1940, the percentage of plant nutrients in all fertilizers has increased from about 20 to about 27 percent.

Recent developments regarding the use of nitrogen fertilizers illustrate the type of adjustment that farmers are making to reduce their per unit costs. Although they used about as much commercial nitrogen in 1956 as in

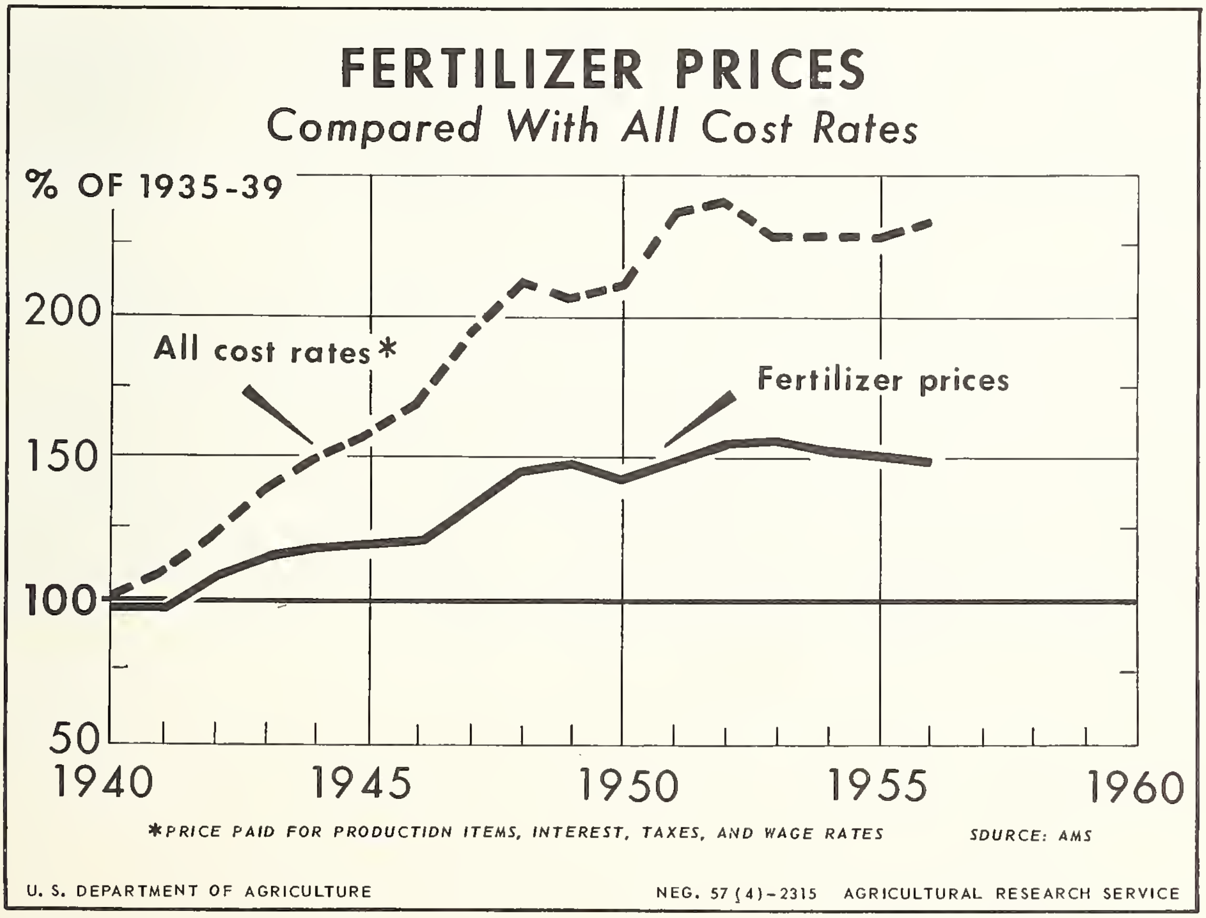

Figure 2

Table 5.- Nitrogen content, price per pound of nitrogen, and changes in consumption of specific kinds of nitrogen fertilizers from 1955 to 1956

Product	Nitrogen content	Price per pound of nitrogen in 1956	Percentage change in consumption from 1955 to 1956 1/
	Percent	Cents	Percent
Sodium nitrate	16.0	19.4	-11
Ammonium sulfate	20.5	15.1	-21
Ammonium nitrate-limestone mixtures	20.5	15.5	-14
Ammonium nitrate	33.5	12.4	-17
Urea	45.0	2/	+33
Ammonia, anhydrous	82.0	9.6	+22
Ammonia, aqua	3/	2/	+30

1/ Based on preliminary estimates of quantities used for direct application in United States, Hawaii, and Puerto Rico for years ending June 30.

2/ Not available.

3/ Varies with the strength of the solution.

1955, they used considerably more anhydrous ammonia and urea and considerably less sodium nitrate and ammonium sulfate (table 5). Nitrate of soda and sulfate of ammonia contain less nitrogen per ton and cost more per unit of nitrogen, whereas anhydrous ammonia and urea contain much more nitrogen per ton and cost considerably less per unit of nitrogen.

Prices paid by farmers for anhydrous ammonia range from about $115 a ton in some States to about $195 in others. Prices paid for sodium nitrate range from about $55 a ton to about $74. Because a ton of anhydrous ammonia contains about 5 times as much nitrogen as a ton of sodium nitrate, the former is a better buy at these prices for farmers who are in a position to use it.

Farmers are also shifting to higher grade mixed fertilizers. From 1950 to 1955, sales of 2-12-6 fertilizers, for example, declined from about 1,356,000 to about 44,000 tons (table 6). During the same period, combined sales of 4-16-16, 12-12-12, and 5-20-20 fertilizers increased from about 27,000 to about 1,574,000 tons.

Table 6.- Consumption of specified grades of mixed fertilizers, years ended June 30, 1950 and 1955 1/

Grade	1949-50	1954-55
	1,000 tons	1,000 tons
2-12-6	1,356	44
5-10-5	993	764
3-12-12	972	1,414
5-10-10	458	1,380
10-10-10	15	725
4-16-16	27	703
12-12-12	-	307
5-20-20	-	564

1/ Preliminary estimates for continental United States only.

BUILDING MATERIALS AND FARM SUPPLIES

Building Materials

Prices paid by farmers for building and fencing materials increased about 3 percent in the year ended April 15. It now takes about $2.66 to buy as much in the way of building and fencing materials as $1.00 bought in 1935-39 and $2.04 bought in 1947-49. Compared with year-earlier levels, prices in mid-April were about the same for lumber, 7 percent higher for asphalt shingles, 7 percent higher for cement, 6 percent higher for paint, 7 percent higher for woven-wire fencing, and 9 percent higher for barbed wire.

Farm Supplies

Prices of farm supplies, including pesticides, averaged about 4 percent higher in mid-April than a year earlier. Advances of about 7 percent were reported in prices of bushel baskets (wood stave), 3 percent for hand tools (hoes, rakes, forks, etc.), and 7 percent for dairy supplies (pails, strainers, etc.).

Indications are that retail prices of baler and binder twine in 1957 will be about the same as in 1956 but about 8 percent below the 1947-49 level.

Pesticides

Manufacturers' prices of most pesticides were about the same in the spring of 1957 as they were 6 months or a year earlier. Prices of copper sulphate declined from the high level reached a year ago, whereas prices of a group of insecticides, including aldrin, lindane and toxaphene, advanced. Prices of lindane this spring are about 50 percent higher than in the fall of 1956.

Stocks of pesticides in manufacturers' inventories were nearly 50 percent larger at the end of the 1956 season than the relatively small stocks at the end of the 1955 season. Quantities of all major pesticides in stock were at least as large as they were in the fall of 1955. Stocks of calcium arsenate were nearly 4 times as large in anticipation of the renewed demand for this insecticide for control of boll weevils that have built up a resistance to some of the newer insecticides.

Production and consumption of pesticides in the United States both attained new records in 1956. Supplies of most pesticides will be ample in 1957. Because of the difficulty of anticipating outbreaks of insects or diseases, however, preferred materials may not always be available at a given time and place and in the quantities desired.

Some of the increased consumption in 1956 was caused by the use of more insecticides on State and National forests by Government agencies to control insects that either destroy trees directly or spread diseases. Also, several million acres of land were sprayed as part of public-supported control programs to halt the spread and reduce the numbers of the gypsy moth, Mediterranean fruit fly, and grasshoppers. These programs expanded the consumption of pesticides but did not add directly to farmers' costs.

FARM REAL ESTATE

Market prices of farm real estate continued to advance during 1956, reaching a new record peak as of March 1, 1957, which was 7 percent above a year earlier and 47 percent above the 1947-49 average. The national average value of farmland and buildings was estimated at $94.52 per acre as of March 1, compared with $88.63 a year earlier.

Values of farm real estate advanced in all except 4 States in the year ended March 1, 1957. Increases ranged from 6 to 9 percent in most States, with the increases somewhat larger than average in Florida, Delaware, Connecticut, Kentucky, Minnesota, North Dakota, and Louisiana. Decreases were limited to Nebraska, Wyoming, Colorado, and New Mexico where drought was a depressing factor (fig. 3).

Trends during the 4 months ended March 1, 1957, were similar to those that have prevailed in the last several years. Increases, mostly 2 or 3 percent, were reported for 38 States. Somewhat larger increases, averaging

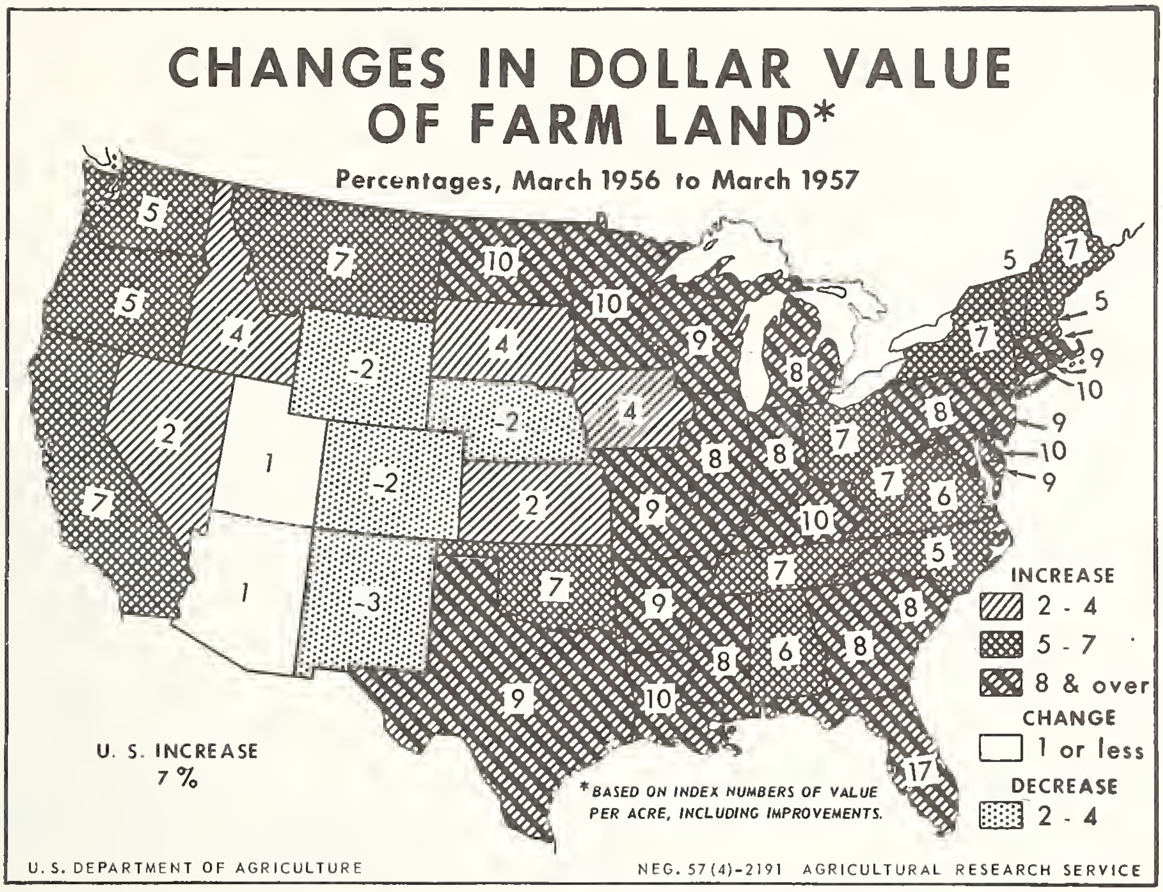
CHANGES IN DOLLAR VALUE OF FARM LAND*
Percentages, March 1956 to March 1957
U. S. INCREASE 7%
*BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS.
INCREASE
2 - 4
5 - 7
8 & over
CHANGE
1 or less
DECREASE
2 - 4
U. S. DEPARTMENT OF AGRICULTURE
NEG. 57(4)-2191 AGRICULTURAL RESEARCH SERVICE

Figure 3

about 5 percent, occurred in New York, Pennsylvania, New Jersey, and Florida. Continued demand for farmland for nonfarm uses has contributed to the increase in market prices in these States for a number of years.

The moderate, but steady, increase in prices of farm real estate during the last 3 years, although contrary to the trend in farm income, represents a continuation of a trend that has been underway since 1941. Only two minor interruptions can be observed, one in 1949-50 and another in 1952-53. The first coincided with the minor postwar adjustments that occurred in many sectors of the economy, and the second followed the slackening of inflationary pressures that were generated by the Korean outbreak. With the resumption of a high level of business activity in 1954, land values again turned upward and the rise has gained momentum each succeeding year.

In addition to the influence of the general economy, farm real estate values have also been strengthened by increased demand from farmers for additional land with which to enlarge existing farms. As the cost-price squeeze became more severe, more farmers have sought to expand their scale of operations in order to reduce unit costs. Because of the generally ample amount of farm machinery and equipment on farms and the increased capacities of new equipment that has become available, many farmers have continued to bid actively for additional land. These considerations have also served to limit the acreage of land on the market. The long-standing belief that land represents a desirable hedge against inflation has further restricted the supply.

To an increasing extent, farmland in many parts of the country is valued on the basis of actual and potential uses for purposes other than farming. The demand created by the rapidly growing population and for living space, factories, service, and recreational areas, is estimated to absorb approximately 1 million acres of farmland each year. Although this is only a small fraction of the total agricultural area of the country, this demand establishes a higher level of market values, which often extends beyond the immediate areas where such changes in land use occur. Location with respect to population centers or to anticipated highways, industrial plants, and suburban expansion far outweighs soil productivity and the income possible from agriculture in such a market environment. As a result, the price of land has become increasingly insensitive to changes in farm income, and those who seek land exclusively for farming purposes find levels of market prices out of line with prospective earnings.

Cash Rents

Cash rents paid for pastureland for the 1957 season were reported to be about the same as in 1956 in most of the North Central States. Rates per acre ranged from a high of $7 to $8 in the eastern Corn Belt, where land values are higher and where much of the pastureland can be cropped, to a low of about $1.50 to $2.00 in the Dakotas (table 7). Regardless of the rate per acre, however, the annual cash rental rate shows a relatively constant relationship to the market value of pastureland. The average ratio of rent to value in these States has ranged between 5 and 6 percent for the last several years.

Although most farms are rented for a share of the crops, or a share of the crops and livestock, a few continue to be rented for cash. The annual cash rental rate for these farms averaged a little higher for the 1957 season than a year earlier (table 8). Highest rates were reported for Illinois, Indiana and Iowa, where market values of land are highest. As with pasture rents, cash rents for entire farms bear a relatively constant relationship to market values. The ratio of cash rent to value averages a little higher for whole farms than for pastureland alone, because of the additional expenses for maintenance of buildings and higher taxes paid by the landlord.

Table 7.- Cash rent per acre for pastureland and ratio of gross rent to value, Corn Belt, Lake, and Northern Plains States, 1954-57

State	Cash rent per acre				Ratio of gross rent to value			
	1954	1955	1956	1957	1954	1955	1956	1957
	Dollars	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent
Ohio	6.50	6.60	7.00	7.00	5.1	5.2	5.7	5.1
Indiana	6.95	6.90	7.40	7.40	4.5	4.3	4.4	4.7
Illinois	7.65	7.60	7.85	8.15	3.4	3.6	3.8	3.7
Iowa	8.05	8.25	8.70	8.65	5.4	5.1	5.7	5.3
Missouri	4.20	4.35	5.10	5.00	6.0	5.7	7.3	6.4
Michigan	3.40	3.45	4.20	4.15	5.6	5.6	5.6	5.8
Wisconsin	4.50	5.40	5.20	5.00	8.6	9.1	8.9	8.7
Minnesota	5.10	5.05	5.45	5.65	6.6	6.6	7.4	6.8
North Dakota	1.20	1.15	1.25	1.40	5.5	5.5	5.8	5.9
South Dakota	1.80	1.90	1.85	1.90	5.5	5.6	5.7	5.7
Nebraska	3.65	3.90	3.85	3.90	5.7	5.8	5.9	6.1
Kansas	3.20	3.45	3.55	3.55	5.8	5.8	5.9	5.7

Estimates supplied by crop reporters, as of April 1, for calendar years indicated.

Table 8.- Cash rent per acre for farms rented wholly for cash, and ratio of gross cash rent to value, Corn Belt, Lake, and Northern Plains States, 1954-57

State	Cash rent per acre				Ratio of gross rent to value			
	1954	1955	1956	1957	1954	1955	1956	1957
	Dollars	Dollars	Dollars	Dollars	Percent	Percent	Percent	Percent
Ohio	9.70	10.45	10.70	12.95	5.2	5.4	5.5	5.9
Indiana	13.85	12.95	14.70	16.50	6.9	5.8	6.6	7.2
Illinois	15.90	16.50	17.25	18.75	5.6	5.6	5.7	5.7
Iowa	13.50	14.05	14.85	15.40	6.1	6.0	6.2	6.2
Missouri	6.70	7.10	7.50	9.55	6.8	6.8	6.9	8.4
Michigan	9.10	9.00	10.25	10.65	6.5	6.4	6.3	6.3
Wisconsin	10.80	11.30	11.75	11.80	8.7	8.1	8.5	8.7
Minnesota	9.45	9.90	10.90	11.35	6.9	6.8	7.1	6.7
North Dakota	3.00	2.70	3.30	3.55	7.6	7.6	8.4	8.3
South Dakota	4.10	4.30	4.65	4.45	7.1	7.5	8.1	7.4
Nebraska	5.90	6.50	6.15	6.95	6.1	6.4	6.0	6.4
Kansas	5.40	5.65	6.05	6.35	6.4	6.1	6.4	6.6

Estimates supplied by crop reporters, as of April 1, for calendar years indicated.

INTEREST, TAXES, AND INSURANCE

Interest

Interest rates charged farmers on both farm-mortgage loans and non-real-estate loans continued to increase during 1956. The rate on new farm-mortgage loans generally increased from 0.5 to 1.0 percentage points between the beginning and end of 1956. Most Federal land banks are now charging 5.0 percent compared with 4.0 percent a year ago. Rates commonly charged by life insurance companies are about 1.0 percentage point above a year earlier with new loans bearing a 5.0 to 5.5 rate. The interest rates charged farmers by the principal lending institutions for non-real-estate loans increased from an average of about 6.3 percent during 1955 to an average of 6.5 percent during 1956.

The rise in interest rates on farm loans accompanied an increase in credit rates for the country as a whole. The cost of money rose most in the financial centers. Because of the relatively tight money situation during 1956, some lenders exercised greater selectivity and were more careful in screening loan applicants. By April 1957, the money-rate situation in the financial centers appeared to have eased somewhat. However, as local rates have not been adjusted fully to the higher money market rates, many farmers will pay more for credit in 1957 than they did in 1956.

Taxes

State and local property taxes payable by farmers in 1957 are expected to total about $1.2 billion, or 5 percent more than in 1956. The rise for real estate taxes will probably be about 6 percent. Little or no increase is in prospect for personal property taxes.

The increase in property taxes that farmers have been paying in recent years arises from larger government expenditures for schools, roads, and general operations. The expected tax payment of $1.2 billion in 1957 compares with $0.9 billion in 1950 and $0.6 billion in 1945.

Insurance

The cost of insuring farm property continued to increase in 1956 but at a slower rate than in prior years. A further small rise is expected in 1957. Farmers are carrying more insurance because of higher replacement costs. Premium rates remain virtually unchanged.

Farmers also carried more hail insurance on growing crops in 1956, but their net cost was reduced by larger than normal reimbursements for losses. Premium rates on hail insurance will be generally higher in 1957 and the amount carried is expected to be large.

COSTS BY TYPE OF FARM

Production costs were higher on most types of farms in 1956 than in 1947-49. However, changes in total cost per unit of production in the last decade have varied considerably by type of farm. Weather has been a factor, but differences have also arisen because (1) certain expenditure items are relatively more important on some types of farms than on others, (2) there has been a shift in the importance of certain expenditures, particularly for nonfarm items on some types of farms, (3) some farm cost rates have increased markedly while others have either changed little or declined since 1947-49, and (4) acreage controls have affected production costs on some types of farms but not on others. With advances in technology and increases in farm wage rates, there has been a tendency to substitute machinery for labor on all types of farms (fig. 4).

Changes in Cost Rates

In most areas, farm wage rates were higher in 1956 than in 1947-49 (table 9). They were more than 40 percent higher on dairy farms in the Northeast, wheat-pea farms in the Pacific Northwest, and cattle ranches in the Intermountain region, but about 10 to 20 percent lower on cotton farms in Texas.

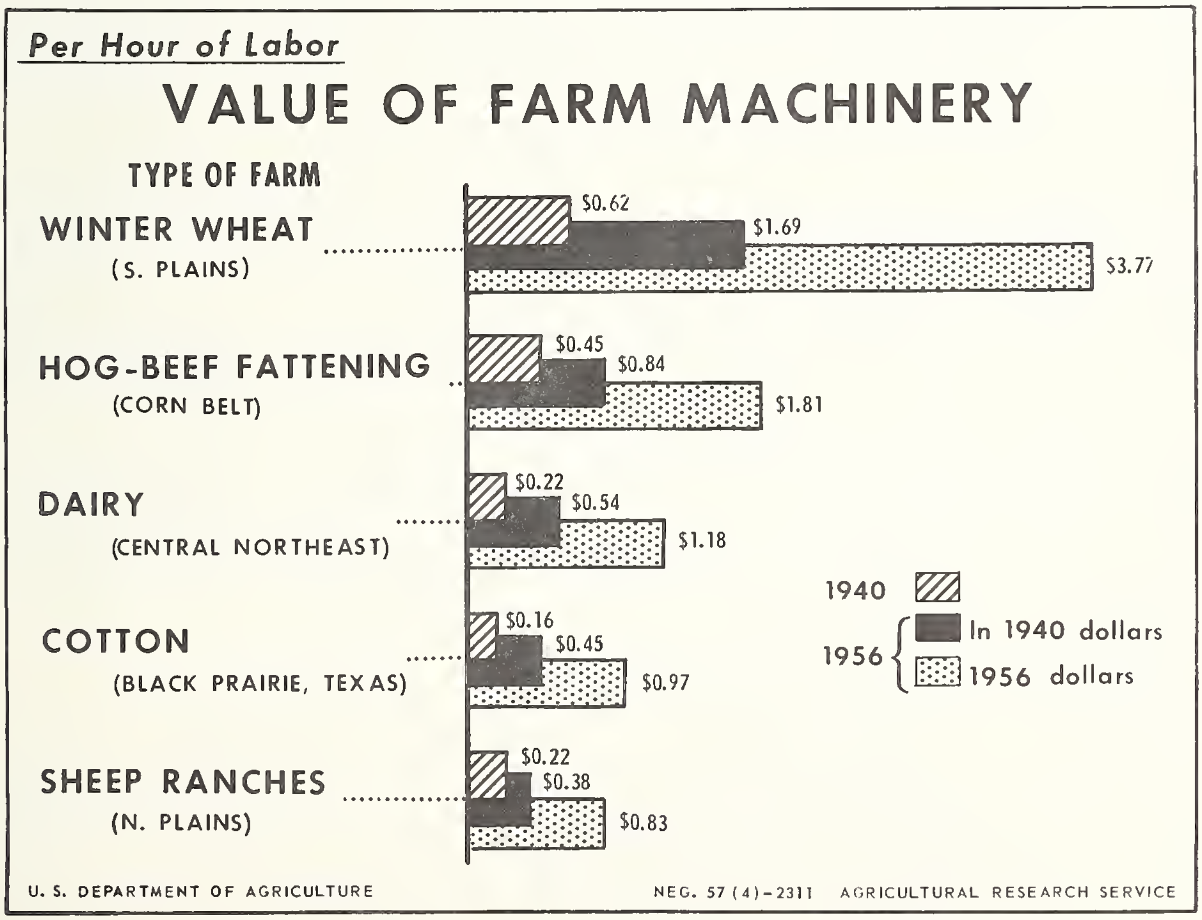

Figure 4

Table 9.- Prices paid by farmers, and related data, commercial family-operated farms, by type, 1956 relative to 1947-49

Type of farm and location	Prices or rates paid				Relative importance 1/		
	Goods and services	Hired labor	Feed, seed: and livestock	Nonfarm goods and services	Hired labor	Feed, seed: and livestock	Nonfarm goods and services
	Index numbers 1947-49 = 100				Percent	Percent	Percent
Dairy farms:							
Central Northeast	108	145	89	124	8	40	52
Eastern Wisconsin	115	131	90	123	6	20	74
Western Wisconsin	116	131	90	128	7	19	74
Corn Belt farms:							
Hog-dairy	114	128	89	125	9	24	67
Hog-beef raising	114	132	89	127	7	27	66
Hog-beef fattening	100	127	89	126	5	62	33
Cash grain	124	138	90	131	6	13	81
Tobacco farms:							
Tobacco-livestock (Kentucky)	120	120	85	126	22	9	69
Tobacco-cotton (North Carolina)	123	2/131	94	121	38	5	57
Cotton farms:							
Southern Piedmont	112	2/128	88	111	21	9	70
Black Prairie, Texas	106	85	92	118	25	12	63
High Plains, Texas (nonirrigated)	112	79	93	124	15	7	78
High Plains, Texas (irrigated)	101	88	87	110	30	2	68
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	111	99	79	115	7	4	89
Wheat-corn-livestock	116	107	88	130	8	11	81
Wheat-roughage-livestock	112	99	78	121	4	12	84
Winter wheat farms:							
Southern Plains	121	121	96	128	6	15	79
Wheat-pea (Washington and Idaho)	126	142	87	126	14	5	81
Sheep ranches:							
Northern Plains	115	126	91	136	23	33	44
Southwest	96	110	80	133	13	55	32
Cattle ranches:							
Northern Plains	125	129	109	127	9	11	80
Intermountain	122	150	97	122	17	13	70
Southwest	109	121	98	131	7	57	36

1/ Based on 1956 expenditures. 2/ Includes cropper labor.

Prices paid for feed, seed, and livestock were generally lower in 1956 than in 1947-49. The relative importance of expenditures for these farm-produced goods varied from less than 10 percent of total expenditures on some types of farms to more than 50 percent on others.

Prices paid for goods and services of nonfarm origin ranged from 10 to 36 percent higher in 1956 than in 1947-49. Expenditures for such items accounted for more than half of all production expenditures on 19 of 23 types of farms studied.

Costs per Unit of Production

Costs per unit of production in 1956 were higher than in 1947-49 on 20 of 23 important types of commercial family-operated farms in widely separated areas in the country (table 10). The increases ranged from a point or two on farms in the Corn Belt and the East to 60 and 70 points on farms in the western areas where drought was most severe in 1956. Per-unit costs in 1956 were about 20 percent lower than in 1947-49 on wheat-small grain-livestock farms, mainly because yields were higher in 1956. Yields of wheat on these spring wheat farms averaged about 40 percent higher in 1956 than in 1947-49. The combined yield index of all crops grown on wheat-small grain-livestock farms averaged 32 percent higher in 1956 than in 1947-49.

Generally speaking, farmers who have been most successful in keeping their per-unit costs down are those who have been able to increase their production most. Lower net farm production in 1956 than in 1947-49 was usually associated with lower average yields. Acreage limitations on cotton, tobacco, and wheat were also contributing factors.

Compared with the previous year, costs per unit of production were higher in 1956 on about half the types of farms studied (tables 10 and 11). They were lower on farms in the Corn Belt, but were higher on all the cotton farms and ranches in the Southwest, except on irrigated cotton farms in the High Plains of Texas. Most of these year-to-year changes are attributable to changes in weather.

Preliminary estimates of costs and returns on these farms in 1956 are presented in table 12. Additional information is published in Costs and Returns, Commercial Family-Operated Farms, by Types and Location, an annual publication of the Department.

Table 10.- Cost of production, and related data, commercial family-operated farms, by type, index numbers, 1956 1/

(1947-49 = 100)

Type of farm and location	Per unit of production		Prices and rates paid 4/	Crop yields	Net farm production	Production	
	Total cost 2/	Operating expense 3/				Per hour of labor	Per unit of input
Dairy farms:							
Central Northeast	101	95	108	121	132	156	116
Eastern Wisconsin	106	113	115	128	119	147	112
Western Wisconsin	95	103	116	133	134	163	126
Corn Belt farms:							
Hog-dairy	103	101	114	122	129	134	117
Hog-beef raising	100	93	114	116	137	132	120
Hog-beef fattening	109	110	100	103	108	119	100
Cash grain	107	109	124	136	134	141	118
Tobacco farms:							
Tobacco-livestock (Kentucky)	130	130	120	121	99	107	93
Tobacco-cotton (North Carolina)	112	111	123	129	112	126	111
Cotton farms:							
Southern Piedmont	108	103	112	115	121	135	112
Black Prairie, Texas	158	146	106	73	69	110	73
High Plains, Texas (nonirrigated)	144	129	112	78	66	94	74
High Plains, Texas (irrigated)	116	114	101	144	133	106	93
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	81	79	111	132	149	167	135
Wheat-corn-livestock	116	118	116	99	109	110	98
Wheat-roughage-livestock	114	117	112	99	114	105	95
Winter wheat farms:							
Southern Plains	171	161	121	58	66	85	70
Wheat-pea (Washington and Idaho)	110	109	126	135	139	131	116
Sheep ranches:							
Northern Plains	120	127	115	83	105	102	96
Southwest	158	138	96	89	57	65	68
Cattle ranches:							
Northern Plains	128	129	125	82	97	109	94
Intermountain	105	130	122	104	128	122	109
Southwest	165	146	109	80	63	90	69

1/ Preliminary. 2/ Includes charges for capital and unpaid labor. 3/ Includes property taxes but no interest.
4/ From table 9.

Table 11.- Cost of production, and related data, commercial family-operated farms, by type, index numbers, 1955 1/

(1947-49 = 100)

Type of farm and location	Per unit of production		Prices and rates paid	Crop yields	Net farm production	Production	
	Total cost 2/	Operating expense 3/				Per hour of labor	Per unit of input
Dairy farms:							
Central Northeast	97	93	107	118	133	158	118
Eastern Wisconsin	108	117	115	121	113	141	107
Western Wisconsin	99	110	115	123	126	148	118
Corn Belt farms:							
Hog-dairy	108	105	113	109	123	124	110
Hog-beef raising	102	98	111	114	129	124	114
Hog-beef fattening	108	109	102	102	112	119	101
Cash grain	123	125	123	116	116	118	102
Tobacco farms:							
Tobacco-livestock (Kentucky)	129	130	118	113	97	107	93
Tobacco-cotton (North Carolina)	112	112	119	116	111	121	108
Cotton farms:							
Southern Piedmont	94	97	117	140	147	144	128
Black Prairie, Texas	105	109	103	125	118	154	104
High Plains, Texas (nonirrigated)	135	121	110	74	68	97	78
High Plains, Texas (irrigated)	130	126	102	118	111	94	84
Spring wheat farms (Northern Plains):							
Wheat-small grain-livestock	86	83	107	123	140	140	126
Wheat-corn-livestock	122	123	116	94	104	102	93
Wheat-roughage-livestock	100	102	113	121	134	120	109
Winter wheat farms:							
Southern Plains	150	142	118	81	76	93	77
Wheat-pea (Washington and Idaho)	135	130	122	116	110	104	93
Sheep ranches:							
Northern Plains	115	120	116	101	114	105	100
Southwest	124	112	103	133	99	108	87
Cattle ranches:							
Northern Plains	118	124	121	100	105	102	99
Intermountain	119	154	119	95	112	111	97
Southwest	126	112	104	118	97	107	87

1/ Revised. 2/ Includes charges for capital and unpaid labor. 3/ Includes property taxes but no interest.

Table 12.- Costs and returns per farm, commercial family-operated farms, by type, 1956 1/

Type of farm and location	Farmland		Farm labor		Total farm capital January 1	Gross farm income	Operating expense	Net farm income
	Total	Cropland harvested	Total	Hired				
	Acres	Acres	Hours	Hours	Dollars	Dollars	Dollars	Dollars
Dairy farms:								
Central Northeast	208	78	4,440	670	30,000	10,168	5,920	4,248
Eastern Wisconsin	129	69	4,310	520	33,770	8,182	4,817	3,365
Western Wisconsin	149	65	3,910	470	22,610	6,802	3,797	3,005
Corn Belt farms:								
Hog-dairy	164	102	4,390	570	43,260	11,017	5,925	5,092
Hog-beef raising	228	105	3,490	240	36,310	6,943	3,610	3,333
Hog-beef fattening	203	143	4,010	600	60,460	19,075	12,177	6,898
Cash grain	232	193	3,290	460	92,110	15,965	6,824	9,141
Tobacco farms:								
Tobacco-livestock (Kentucky)	116	30	3,880	2/1,080	23,720	5,953	2,753	3,200
Tobacco-cotton (North Carolina)	100	39	6,610	2/3,770	21,350	8,281	4,812	3,469
Cotton farms:								
Southern Piedmont	179	55	3,980	2/1,530	16,290	4,219	2,511	1,708
Black Prairie, Texas	180	97	3,170	910	29,030	4,022	3,048	974
High Plains, Texas (nonirrigated)	381	241	3,340	1,070	38,250	8,145	4,819	3,326
High Plains, Texas (irrigated)	320	270	8,810	6,390	88,540	28,361	15,625	12,736
Spring wheat farms (Northern Plains):								
Wheat-small grain-livestock	695	441	2,940	450	45,200	12,411	5,419	6,992
Wheat-corn-livestock	487	318	3,880	460	41,880	8,081	4,725	3,356
Wheat-roughage-livestock	785	392	3,430	220	40,700	8,156	5,034	3,122
Winter wheat farms:								
Southern Plains	720	284	2,360	300	76,540	8,033	4,781	3,252
Wheat-pea (Washington and Idaho)	549	382	3,350	1,050	155,680	23,782	9,887	13,895
Sheep ranches:								
Northern Plains	6,189	204	7,680	3,660	81,770	18,630	12,934	5,696
Southwest	12,836	16	5,030	2,340	177,220	13,796	13,103	693
Cattle ranches:								
Northern Plains	4,120	251	3,970	690	69,900	7,970	6,044	1,926
Intermountain region	1,710	180	5,050	1,030	61,650	10,981	5,261	5,720
Southwest	10,660	18	3,540	940	130,640	7,083	8,328	-1,245

1/ Preliminary. 2/ Includes cropper labor.

MORE CAPITAL GOODS USED IN FARM PRODUCTION

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Farmers have made many changes in the kinds and quantities of resources used on their farms during the last 20 years. But among the changes that have occurred, the use of more capital goods to increase production efficiency is most significant. The number of people working on farms has decreased but so has the number of farms, and the number of workers per farm now is only a little less than it was 20 years ago. However, the quantities of capital goods used annually per farm have gone up greatly. They have helped to make possible a doubling of production per farm. The major effects of using more capital goods on farm costs, incomes, and production are discussed below.

Two Categories of Costs

Farmers' costs of production need to be considered in two categories.

First, there are cash costs for the items that farmers buy and use in farm production. This category includes expenses for such things as feed, seed, livestock, fertilizer and lime, hired labor, repairs and replacements of machinery and buildings, gasoline and other petroleum fuel and oil, and miscellaneous supplies and services. These commonly are referred to as farm production expenses.

Second, there are noncash costs for the items that farmers use without making payments for them. This category includes the labor of the farm operator and unpaid members of his family and unpaid interest on the money invested in land, buildings, machinery, and other items used in farm production. These resources have opportunity costs to individual farmers. If they were not used on the operators' farms, they could be used to earn incomes in other uses.

Production Expenses Higher

When calculated in constant dollar values, expenses per farm for the following items - feed, fertilizer and lime, and petroleum fuel and oil - have more than tripled since 1935-39 (table 13). Depreciation charges and purchases of livestock, seed, and miscellaneous supplies and services have doubled. If the costs of all such items at constant prices are added together, they average about 2 1/2 times as much per farm for 1955 as for 1935-39.

Feed, seed, and livestock are items of farm origin. However, when farmers buy these resources, they pay for transportation, handling, and other services that may represent a substantial part of their total cost. Feeds often contain materials that are not of farm origin.

Table 13.- Changes in output and in production expenses at constant prices for selected groups of cash-cost items used in production, per farm, United States, 1935-55

Item	Average 1935-39	Average 1940-44	Average 1945-49	Average 1950-54	1955
	Percent	Percent	Percent	Percent	Percent
Farm output per farm	100	131	147	172	196
Production expenses per farm: 1/					
Feed	100	196	272	318	357
Livestock	100	156	178	214	249
Seed	100	169	181	206	239
Fertilizer and lime	100	169	258	377	442
Buildings, repairs and maintenance	100	110	135	166	203
Depreciation of capital items 2/	100	145	161	247	286
Petroleum fuel and oil	100	146	240	352	385
Miscellaneous supplies and services	100	114	138	190	211
Hired labor	100	111	99	95	93

1/ Computed by adjusting cash expenses of farm operators for farm production for changes in prices paid by farmers for these items. Data on income and price changes are from recent issues of The Farm Income Situation and Agricultural Prices, respectively, published by the U. S. Agr. Marketing Service.

2/ Depreciation and other consumption of buildings, motor vehicles, and other machinery and equipment.

Purchases of motor vehicles and machinery and equipment in quantities averaging at least three times as large per farm as in 1935-39 are required to maintain inventories of these items at present levels.

The large purchases of these goods and services have helped to make possible a doubling of production per farm since 1935 without the use of more hired labor. Hired labor is the only major cash-cost item that has decreased in volume per farm.

Farmers now buy annually about 20 percent more production items in the cash-cost category per unit of production but use about 55 percent less hired labor than in 1935-39. However, hired labor accounted for only 16 percent of all production expenses in 1935-39 and 13 percent in 1955 when measured in actual dollars. If these different items are valued at constant prices, the reduction in costs of hired labor has not been great enough to offset the additional costs of the other items. In fact, the total volume of the cash-cost items purchased annually averaged about 10 percent higher per unit of production in 1955 than in 1935-39.

Unpaid Interest Charges Up

The total volume of assets in the form of real estate, machinery and equipment, crops held for sale, livestock, and demand deposits used for farm production has increased about 60 percent per farm since 1940 (table 14). Unpaid interest charges on capital invested in farm assets have gone up by about the same percentage. However, production per farm increased by about 75 percent, so land and capital items in the noncash category used per unit of production decreased about 10 percent.

Table 14.- Changes in value of noncash items per farm at constant prices on January 1 and in number of farm family workers per farm, 1940-56 1/

Item	1940	Average 1940-44	Average 1945-49	Average 1950-54	1955	1956
	Percent	Percent	Percent	Percent	Percent	Percent
Real estate	100	105	115	132	146	151
Machinery	100	112	145	297	331	338
Other assets	100	116	132	139	154	161
Total assets	100	108	121	141	157	163
Farm family workers 2/	100	99	104	97	97	96

1/ Data on assets are estimates prepared by the Farm Economics Research Division, Agricultural Research Service. Assets include farm real estate less value of dwelling, crops held for feed, livestock, machinery and equipment less 60 percent of value of automobiles, and demand deposits used for production. Estimates are not available for years prior to 1940.

2/ Data from Agricultural Marketing Service.

The number of family workers per farm (farm operators and unpaid members of their families) decreased by 4 percent (table 14). There are now only about half as many family workers per unit of farm production as in 1940.

Capital Increases Steadily

The total quantity of capital items used per farm has risen from one year to the next without exception throughout the last 20 years, despite large changes in prices received for farm products, prices paid for capital items, and net incomes of farmers. Apparently, farmers have decided that expansion in farm size and use of more machinery, fertilizer, and other materials to increase output and apply new or improved production methods would be profitable each year despite wide variations in prices and incomes. This checks with the findings of most studies of the changes in use of resources that individual farmers could make to improve their net farm incomes. In general, these studies show that the use of more capital goods, and especially improved kinds of capital goods, to expand output and apply new production methods would be profitable on individual farms under price conditions such as have prevailed during any of the last 20 years.

Several developments have made expansion in use of capital goods profitable for individual farmers. No doubt rising wage rates for hired labor as compared with prices of machinery and fuel have been important in bringing about the substitution of machinery for labor. Expansion in supplies of fertilizer at prices to farmers that have risen less than prices of farm products has helped to make increased use of fertilizer profitable. Apparently also, farmers have recognized the profitability of larger purchases of feeds to provide better balanced rations for livestock, seeds to obtain higher yielding varieties of crops, pesticides to control diseases of plants and animals, water for irrigation, and machinery to permit timeliness and effectiveness of operations so that higher crop yields and forage feeds of better quality may be obtained.

Real Incomes Higher

The changes farmers have made in resource use and production methods have helped to increase their real incomes and reduce the real costs per unit of production.

Purchasing power of net farm income per farm averaged about 60 percent greater in 1955-56 than in 1935-39 according to estimates of the Agricultural Marketing Service. None of this gain can be attributed to more favorable price relationships. Prices paid by farmers for production and consumption items went up a little more than prices received for farm products. The parity ratio (the ratio of the index of prices received for farm products to the index of prices paid by farmers for commodities, interest, taxes, and wages) averaged 86 percent in 1935-39 as compared with 84 in 1955 and 83 in 1956.

The increased purchasing power of net farm income, however, must cover an investment in farm assets that is about 60 percent higher in constant dollars than in 1940.

Cost Structure Changed

The large increases in expenditures for capital goods in the cash category as compared with those in the noncash category have brought about important changes in the cost structure of farm production. Production expenses accounted for 57 percent of gross farm income in 1935-39 as compared with 66 percent in 1955-56.

The relative importance of wages paid for labor as a cost factor in farm production has changed very little despite the large reduction in the use of labor as compared with other resources. This is because of the large rise in wage rates as compared with prices paid for other cost factors.

As cash costs have increased in relation to gross farm income, net farm income now is affected more by changes in the relation of prices received for farm products to prices paid for production goods and services than was formerly the case. For example, each 1-percent decline in prices received with no change in prices paid for items in the cash-cost category brings about a reduction of 3 percent in net income per farm at present as compared with 2.3 percent in 1935-39. With a relative rise in prices received by farmers, the reverse would be true.

Cost Reduction Opportunities

The increase in cash costs does not mean that reductions in the purchases of cash-cost items would be profitable for most farmers when prices of farm products decline. On most individual farms, reductions in cash expenditures for fertilizer, fuel, feed, and other items would reduce production more than total costs and thus would tend to raise costs per unit of production. Net incomes for individual farmers would be less with a smaller production and their costs per unit would be higher.

Costs per unit of farm production now are lower than they would be if farmers were not using larger quantities of capital goods to apply improved methods of production. The much larger production that is possible with the use of more capital goods and better production methods, is responsible for the lower costs.

Real incomes per farm increased during the last 20 years with the reductions in real costs per unit of production that accompanied the use of more capital goods, although total production per farm increased greatly. But this was because market outlets expanded enough so that prices for the much larger volume of production averaged almost as high relative to prices paid by farmers for production goods and services in 1955-56 as in 1935-39. Expansion in production tends to make prices of farm products lower than they would be otherwise and lower prices reduce the benefits to farmers and reductions in costs per unit of production.

Looking ahead, a critical question is, Will market demand for farm products increase as rapidly as total farm production? The rate of expansion in total production in the future undoubtedly will depend to a large extent upon how rapidly the quantities of capital goods used in farming increase. It is not likely that reduction in the use of capital goods will be profitable on many farms even if market demand fails to keep pace with farm production. Probably, opportunities are still available for reducing costs per unit of production on many farms by using additional capital goods to apply improved production methods.

SMALL FARMS HAVE HIGHER UNIT COSTS

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The average size of commercial farms in the United States, as indicated by all measures except size of labor force, has increased rapidly since 1940. In total acreage, the increase has been from 220 acres in 1940 to 336 acres in 1954 (fig. 5). The average value of farm sales (valued at 1954 prices) has increased from $4,000 in 1940 to $7,500 in 1954. Some of the increase in size, however, has resulted from a reduction in the number of sharecroppers in the Southeast.

Several factors have contributed to the growth in size of farms in the United States. New machinery better adapted to farmers' needs has been developed. With relatively high incomes during and immediately after World War II, farmers have been able to finance the purchase of this machinery. In addition, wage rates in recent years have been roughly four times the 1937-41 average, while prices paid for motor fuel and machinery have been about 50 and 120 percent higher, respectively. These changes in price relationships increased the incentive to shift from labor to machinery.

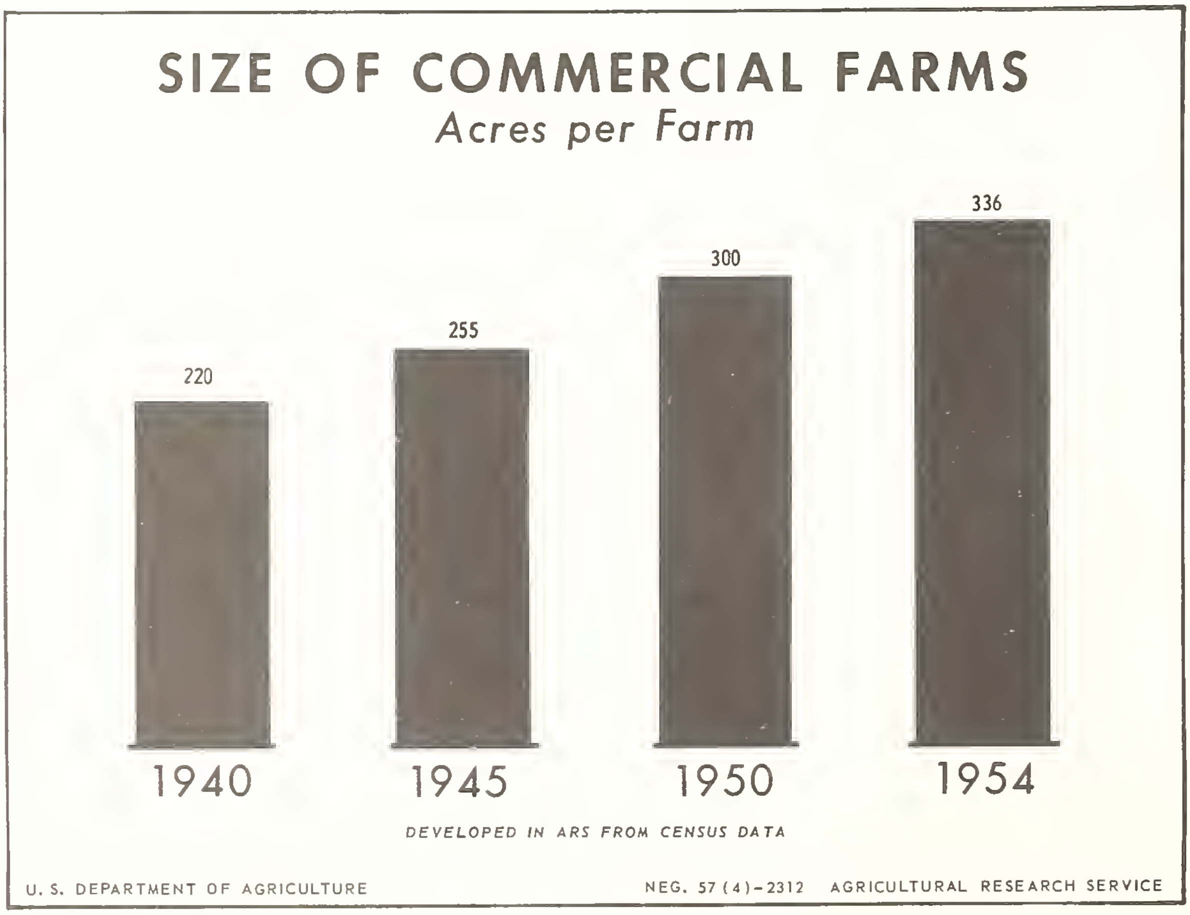

Figure 5

Size as measured by output has also been increased by new varieties of crops, increased fertilization, improved breeding of livestock, and other improved production practices which have increased yields per acre and production per unit of livestock. As a result, production per farm has increased more than acreage per farm.

As many farms depend on operator and family labor exclusively and some farms need additional labor to provide a crew of minimum size or to do seasonal work, it is not always feasible to reduce the size of the farm labor force. Therefore, it has been necessary to increase the acreage farmed to utilize fully the farm labor force and the machinery.

The relationship between change in farm size and change in real cost per unit of production on four types of commercial family-operated farms is shown in table 15. The increases in total land farmed ranged from 10 percent on southern Piedmont cotton farms to 26 percent on wheat-pea farms in the Pacific Northwest. The increase in total investment (at 1947-49 prices) ranged from 15 percent on southern Piedmont cotton farms to 35 percent on hog-beef raising farms. The farm labor force was smaller in 1952-56 than in 1937-41 on each of the four types of farms. The decreases ranged from 4 percent on hog-beef raising farms to 22 percent on southern Piedmont cotton farms. The large reduction on southern Piedmont cotton farms resulted partly from the smaller acreage of cotton grown after allotments were reinstated in 1954. On all four types of farms, the reduction in the labor force reflects the shift from labor to machinery following the development of suitable machinery and the relatively large increase in farm wage rates. Industry, by offering employment at substantially higher wages, has pulled labor away from farms.

Table 15.- Changes in farm size and in real cost of production, selected types of farms, 1937-41 to 1952-56

Measures of size and costs	Type of farm			
	Northeast dairy	Corn Belt hog-beef raising	Northwest wheat-pea	Southern Piedmont cotton
	Percent	Percent	Percent	Percent
Total land farmed	+14	+21	+26	+10
Man equivalent	-18	-4	-16	-22
Investment (constant price)	+30	+35	+29	+15
Total inputs (constant price)	+22	+39	+19	+18
Gross farm production (constant price)	+45	+70	+51	+38
Total cost per unit of production (constant price)	-16	-18	-21	-15

The total of farm inputs reflects the combined effect of changes in land, labor, and capital, and is probably the best measure of change in farm size. The increase in total inputs ranged from 18 percent on southern Piedmont cotton farms to 39 percent on hog-beef raising farms. Increased capital is the chief factor behind the increase in total inputs.

On all types of farms, gross farm production increased more than total inputs. The range was from 38 percent more on southern Piedmont cotton farms to 70 percent more on hog-beef raising farms.

The reduction in real cost per unit of production (at 1947-49 prices) reflects the increase in total output relative to total inputs. Real cost per unit of production has decreased on each type of farm, ranging from a decrease of 15 percent on southern Piedmont cotton farms to 21 percent on wheat-pea farms. The index of real cost per unit of production measures both the advantage of adjusting to new price relationships and improvement in farm efficiency.

The advantage of a large farm with present-day mechanization may be more concretely illustrated by comparing small- and large-scale cotton farms in the Mississippi Delta area. The small-scale farms averaged about 57 total acres, with 33 acres of cropland and 12.5 acres of cotton, in 1956. The labor force consisted of operator and family labor with only a small amount of labor hired for chopping and picking cotton. About three-fourths of these farms used tractors. Total investment amounted to $11,460 in 1956. The large-scale cotton farms averaged 1,000 acres with 625 acres of cropland and 212 acres of cotton in 1956. Tractors were used for power almost exclusively on these farms. Total investment on these farms averaged $181,690 in 1956.

Returns to the operators and their families for labor and management in 1955 on the small cotton farms averaged $1,510 compared with $15,971 on the large-scale farms. Lower annual returns on the small farms were due to both high costs per unit of production and a small volume of production. For various reasons, the total cost per unit of production was about 10 percent higher on small than on large cotton farms: (1) About a fourth of the preharvest tillage work is done with mules on small cotton farms, whereas tractors are used almost exclusively on large-scale farms; (2) 4-row tractor equipment is used for at least three-fourths of the work on the large cotton farms while 2-row equipment is used with tractors on small farms; (3) about half the cotton is picked mechanically on the large-scale cotton farms compared with only 15 or 20 percent on the small farms; (4) labor used per acre of cotton amounts to 115 hours on small farms compared with 75 hours on the large cotton farms; and (5) labor used per acre on other crops is generally about 30 to 40 percent less on large-scale than on small farms.

Even though mules are used on some of the small cotton farms, the depreciation and operating cost of tractors and machinery per acre of cropland harvested is nearly as high on small as on large-scale cotton farms. The relatively lower costs on the large cotton farms reflects the economy of large machines and better utilization of machinery.

Per-unit costs are higher on the small cotton farms because of a higher charge per unit of production for the use of machinery. The investment in machinery amounts to $77 per acre of cropland on small cotton farms compared with $44 on large-scale cotton farms. The small cotton farms have 24 tractors per 1,000 acres of cropland compared with 11 tractors on the large cotton farms.

Expenditures per acre for poison and fertilizer are slightly lower on the small cotton farms, which may account in part for the lower yields on these farms.

Cost per unit of production (at current prices) on small cotton farms has increased 35 percent since 1944. This compares with a 12-percent increase on the large-scale cotton farms. As prices paid for items used in production have increased about the same amount on both sizes of farms, the differences in cost are due to differences in the gains in efficiency. On the production side, crop yields and net farm production have increased relatively more on small farms. Mechanization has increased on both sizes of farms but, as noted previously, more of the operations are mechanized on the large-scale than on the small cotton farms. However, the investment in power and machinery has increased 2.7 times since 1944 on small farms, compared with 1.6 times on large-scale farms. Mechanization was well along on large farms in 1944. It appears that the operators of many small cotton farms have purchased tractors and equipment but have not yet obtained the additional land to provide for full utilization of this equipment.

Records are not available on medium-sized cotton farms in this area but well-organized medium-sized cotton farms could very well have lower costs than either the small- or the large-scale cotton farms. Machinery can be used more efficiently on medium-sized than on small farms and overhead costs are frequently lower on medium-sized than on large farms.

The relative efficiency of small, medium, and large farms is indicated by studies in Nebraska and Montana. In northeastern Nebraska, a corn-livestock farm of 200 acres was found to make reasonably good use of a 2-plow tractor and its equipment and the full time of one man. The study revealed that gains in efficiency were relatively small as farms became larger than this size. In eastern Montana, the total cost per acre of wheat decreased from $29.50 on farms with 385 acres of cropland to $22.50 an acre on farms with 800 acres of cropland. But as farms increased from 800 to 1,600 acres, expenses per acre decreased much less, from $22.50 to $20.00.

A recent study indicates that large-scale farms operated primarily with hired labor are not replacing family farms. 1/ When allowance is made for the increased capacity of labor, large-scale farms make up the same proportion of all farms and operate the same proportion of the total land farmed in each census year since 1940. Although large-scale farms are now larger, they are relatively no more important in the economy than they were 25 years ago.

1/ For greater detail, see Family Farms in a Changing Economy, U. S. Dept. Agr. Agr. Inform. Bul. 171, March 1957.

COSTS OF IRRIGATION

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Irrigation has long been essential for intensive crop production in the arid and semiarid sections of the West and is rapidly increasing in other sections of the United States. From 1949 to 1954 the acreage of irrigated land has increased about one-seventh. Slightly over one million acres a year were added to the irrigated land of the United States from 1945 to 1954. The estimated acreage under irrigation in 1956 was 31.5 million acres.

Most of our irrigation (91 percent) is in the 17 Western States. If Arkansas, Louisiana, and Florida are added, the 20 States accounted for 98 percent of the irrigated acreage in 1954. Nearly 15 percent of the cropland in these States is irrigated. All of the rice and about 95 percent of the sugar-beet and hop acreage is irrigated; about 64 percent of the acreage of vegetables harvested for sale, and 55 percent of the fruit and nuts in the 20 States are irrigated.

Supplemental irrigation in the East has increased rapidly since World War II. The irrigated acreage in 28 eastern States has increased from 62,000 acres in 1945 to 587,000 acres in 1954. 1/ Indications are that this rapid rate of expansion has continued through 1956. About 60 percent of this acreage is used for the six crops of rice, Irish potatoes, pasture, corn, cotton, and tobacco.

Typical Investment Costs

Investment costs per farm and per acre show wide variation because of individual farm differences in topography, sources of water, methods of irrigation, and size of irrigation system. The major portion of the acreage in the West is irrigated by flooding, and consequently leveling is one of the major investments. If a large amount of leveling is necessary, the investment costs will be higher. In developing sources of water, it is generally much more expensive to develop irrigation wells than to use water from irrigation ditches such as is typical of the large projects of the West.

The method of irrigation has a direct bearing on investment, as shown in table 16. A study in Nebraska disclosed investment costs per farm, for the distribution system only, of $890 for the siphon-tube method of irrigation, $4,220 for the gated-pipe method, and $4,470 for sprinklers. On a per-acre basis this was $10.60, $45.90, and $66.70, respectively, for the three methods. 2/ Sprinklers generally require more investment in equipment and less

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1/ U. S. Bureau of the Census and U. S. Agricultural Research Service. Irrigation in Humid Areas, U. S. Census of Agriculture, vol. III, Part 6. 1956.

2/ Thorfinnson, T. S., and others. Cost of Distribution of Irrigation Water by Different Methods. Nebraska Agr. Expt. Sta. Bul. 432, August, 1955.

Table 16.- Investment costs per farm and per acre, 28 eastern States, 1954

Method of irrigation	Investment	
	Per farm	Per acre
	Dollars	Dollars
Portable sprinkler	5,379	166
Fixed overhead pipe	5,661	577
Portable gated pipe	4,802	80
Ditch	2,786	62
Flooding	5,374	38
Average	5,542	145

in land leveling. In the High Plains of Texas where furrow irrigation with water from wells is used, the capital investment per farm in 1954 was $9,810, or $56 per acre irrigated.

The acreage irrigated on each farm affects not only the investment cost per farm but also the investment cost per acre. As acreage irrigated increases, the investment cost per acre decreases while investment per farm increases, as indicated in table 17.

Table 17.- Relationship between size of operation and investment per farm and per acre, 28 eastern States, 1954

Acres irrigated per farm	Investment 1/	
	Per farm	Per acre
	Dollars	Dollars
Under 10	2,288	500
10-19	4,007	300
20-29	4,761	207
30-49	5,843	159
50-99	8,371	125
100-199	12,620	96
200-499	19,502	70
500-999	44,892	72
1,000 and over	109,225	54

1/ Includes irrigation equipment, leveling, ditching, reservoirs, and wells.

Operating Costs

Because many different factors affect the costs of operating irrigation facilities, these costs vary from a few cents to several dollars per acre-inch. The chief factors that affect operating costs are amount of use, size of irrigation system, source of water, method of irrigation, kind of crops irrigated, and management.

The amount of use is important so far as operating costs are concerned. Overhead or fixed costs of depreciation and interest are substantial and costs per acre or per acre-foot decrease as more acres are irrigated or as more water is applied to a given acreage by the same system. The importance of amount of use and size of well in the High Plains area of Texas is illustrated in table 18.

Table 18.- Cost of water per acre foot from irrigation wells, by discharge rate and hours pumped, Texas High Plains, 1947-49 1/

Wells grouped according to gallons-per-minute discharge rate	Wells grouped according to hours pumped annually		
	Lower third (av. 463)	Middle third (av. 865)	Upper third (av. 1,463)
	Dollars	Dollars	Dollars
Less than 501 (av. 397)	22.42	16.24	13.21
501-750 (av. 647)	13.86	9.94	8.12
751-1,000 (av. 860)	10.44	7.47	6.09
Over 1,000 (av. 1,148)	7.78	5.59	4.57
All wells (av. 740)	12.10	8.67	7.10

1/ When butane and automobile engines rated at more than 100 horsepower were used.

Magee, A. C., and others. Costs of Water for Irrigation on the High Plains, Texas Agr. Expt. Sta. Bul. 745, February 1952.

The type of distribution system used has a great deal to do with both operating and investment costs. The Nebraska study that was referred to previously, in which siphon-tube, gated-pipe, and sprinkler systems were compared, generally shows highest total costs for sprinklers and lowest costs for the siphon-tube system. It is noted that for very rough topography or sandy soils sprinklers may be the only system feasible. A shallow soil or a soil underlain by gravelly or rocky parent material may make leveling impracticable. Sprinklers usually require more labor and more power because of the need for pressure in the sprinkler line, but they are more efficient in distributing water. Efficiency of water distribution is important when it comes to stretching a limited supply of water over more acres or reducing the loss of plant nutrients by leaching. Gated pipes result in higher investment costs than siphon tubes from ditches, but they are more convenient to operate, require less labor, and generally save some water from ditch loss. Under certain topographic conditions, gated pipes may save some cost of leveling. It is necessary to consider the circumstances of each case to find the most suitable method of applying the water.

Irrigated vs. Nonirrigated Cotton in Texas High Plains

In the High Plains area of Texas the average rainfall is about 17 inches, but it is highly variable. In some years when rainfall is high, irrigation will show little or no response in yield or quality of cotton. In years of drought, irrigation may mean the difference between a good crop and complete crop failure. In deciding whether or not to invest in irrigation facilities, farmers need to consider frequency of drought as well as the cost of the facilities, kinds of crops to be irrigated, and prospective price relationships. A comparison of costs and returns on irrigated and nonirrigated cotton farms over a 12-year period in the Texas High Plains area indicates the advantages of irrigation (table 19). Net farm income on irrigated farms was more than double the amount received on nonirrigated farms. Part of this increase, however, was due to an 18-percent larger acreage of cotton. Net farm income per acre of cotton harvested was $73 on irrigated farms and $37 on nonirrigated farms.

Table 19.- Average annual costs and returns per farm, irrigated and nonirrigated cotton farms, Texas High Plains, 1944-55

Item	Unit	Cotton farms	
		Irrigated	Nonirrigated
Total land per farm	Acre	280	320
Cotton harvested:			
Acreage	do.	130	110
Quantity	Bale	95	36
Total capital	Dollar	58,000	28,000
Operator and family labor	Hour	2,260	2,040
Gross income	Dollar	19,800	8,600
Operating expense	do.	10,300	4,500
Net farm income	do.	9,500	4,100

Based on annual estimates made by W. Herbert Brown published in Farm Costs and Returns, Commercial Family-Operated Farms by Type and Location, U. S. Dept. Agr. Agr. Inform. Bul. 158; and Costs and Returns, Commercial Family-Operated Farms by Type and Size, 1930-1951, U. S. Dept. Agr. Statis. Bul. 197.

ECONOMICS OF FARM SERVICE BUILDINGS

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Farm service buildings represent a major investment in farming, second only to the investment in land. Service buildings are long-term investments recoverable over periods that range from 20 to 40 or more years. The critical point in making a sound investment in farm buildings that will render effective and economical service throughout their life is in the planning phase. Thus the buyer of a farm should make an especially thorough evaluation of the buildings on the farm, for usually he will spend a substantial part of the purchase price for buildings.

Investment

The amount invested in service buildings is large in terms of both dollar values and proportion of total farm investment. On some farms, especially those with small acreages or highly intensive livestock enterprises, the investment in buildings often equals or exceeds the investment in land.

But the range in value is wide, even within a single State. For example, the 1955 depreciated value of service buildings ranged from $20 to $25 per tillable acre on grain farms in southern Illinois to more than $100 per tillable acre on the small highly productive dairy farms in the northern part of the State. Construction of service buildings of the same kind at 1955 prices would cost at least twice the inventory value, or from about $40 to more than $200 per tillable acre. Thus new service buildings would account for 15 to 20 percent of the investment in land and buildings on grain farms and as much as 35 to 40 percent on dairy farms.

Average investments in buildings as a percentage of total real estate commonly decrease as size of farm increases because of the economies of constructing larger buildings and the relatively fixed requirements for some types of buildings regardless of size of the farm. Building investments per tillable acre on livestock farms of less than 180 acres were usually 30 to 50 percent greater than on livestock farms of 340 to 500 acres. The effects of farm size were even more pronounced on grain farms, where average building investments per acre ranged from 50 to more than 100 percent greater on the small than on the large farms.

Function of Buildings

As the term implies, service buildings have certain functions to perform just as do fertilizers or protein supplements. The investment in buildings should be consistent with the contributions that they make to the farming operation. Most existing buildings do not fully meet this objective. The influence of a farm building, or the organization of a group of farm buildings, on the costs of production may be much greater than the direct costs of using a building. To some extent, the effectiveness of most of the other inputs on livestock farms is increased or decreased by the service buildings. This is especially true of labor, more than half of which is performed in and around buildings. Limited investigations indicate that investment in buildings produces about as low a rate of return as any item of investment in farming.

A method of estimating the allowable investment in buildings is to answer the question, "How much rent can the animals (or product) pay"? This is sometimes done by assuming that, after deducting an average amount for all costs of production other than for buildings, the residual amount of gross return is available to pay the annual building costs. Allowable investment in buildings is then calculated by capitalizing the residual gross return at a rate which is computed by dividing the annual costs for adapted buildings by the original investment for such buildings.

This analysis provides a guard against overinvestment, but it contains no measure of the functional contribution of buildings, it credits buildings with the results of good management of the enterprise, and it is vulnerable to errors in price forecasting. Buildings are assumed to be the residual claimant, whereas eventually all factors of production have an equal claim on returns. Also, this method emphasizes the maximum allowable for buildings, or the break-even point.

The problem should be approached from the standpoint of the need for service buildings, with emphasis on the functions they perform and the most economical way of providing these functions. Service buildings for dairy farms provide a practical example. Their general functions are: (1) To provide conditions conducive to healthy animals and to efficient conversion of feeds into milk; (2) to facilitate production of clean and sanitary milk; (3) to help minimize the cost of labor and equipment; (4) to store feed so as to maintain its quality and facilitate processing and feeding; and (5) to adapt easily to changing needs.

Farm service buildings are usually thought of as specific types of buildings applying to specific enterprises. Some specialization is often justified, but farm buildings must serve the needs of a farm business over a long period of time. Needs change, technological advancements occur, and even basic enterprises may differ over a period of years. Inability either to replace or remodel buildings economically to fit changing production plans has been a major factor in retarding labor efficiency in livestock operations.

Midwestern dairy farmers commonly invest in excess of $500 per cow in dairy structures. A recent study evaluates in part the effects on labor requirements and quality of milk of dairy systems representing a large reduction in investment. 1/ Tests were conducted over a 3-year period under conditions ranging from an open barn with two or three wooden milking stalls set in an earthen floor to loose housing and elevated stall milking rooms completed in

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1/ Economies in Farm Dairy Buildings and Equipment in Relation to Sanitary Quality of Milk, U. S. Dept. Agr. Agr. Inform. Bul. 1953, 1957.

accordance with the standards established by the Illinois Department of Public Health for production of Grade A milk.

Results of this study indicated that by following known sanitation practices, milk of high sanitary quality could be produced with half the labor and half the investment in buildings and equipment commonly found on dairy farms in the area. Average investment at 1950 prices for adequate buildings and equipment was only $212 per cow with 20 to 25 cow herds. Labor was reduced from the usual 119 hours to 67 hours per cow per year. Milk production was maintained at a uniformly high level in both stall barns and loose housing systems.

Detailed structural specifications were found to be much less important in producing milk of high sanitary quality than facilities designed to reduce the amount and difficulty of the labor needed to perform necessary chores. General factors contributing most to efficiency included a knowledge and application of the basic sanitation practices, a shift in investment to less for buildings and more for mechanical equipment, and loose housing systems that permitted flexibility in herd size and use of standard tractor equipment for mechanizing part of the chores.

Remodeling

Construction of new buildings presents the opportunity of selecting adaptable structures and establishing an effective system of all buildings, which although constructed piecemeal, can be planned as a unit. Need for new structures will increase in the future largely because many original farmsteads are reaching the age when replacement cannot be postponed much longer. A recent investigation on 317 Illinois farms covering the period 1945-54 showed that buildings on these farms averaged 8 years older in 1954 than in 1945. 2/

Carefully planned remodeling of existing buildings to gain the essential functions and to increase efficiency in the use of related factors of production, however, remains the best and most economical solution on many farms. Again, dairying serves as an example.

Included in the study of the economies in farm dairy buildings were four operators who produced milk in stall barns and sold Grade A milk on the St. Louis market. Eighteen months after the beginning of the study, one dairyman was faced with the choice of reducing both the amount and difficulty of dairy chore work or going out of the dairy business. He remodeled his stall barn into a loose housing system with an elevated stall milking room equipped with a pipeline milker. Records of the milking operations in this new setup were continued for an additional 18 months. Results are summarized in table 20.

The additional investment of $1,845 was divided two-thirds for equipment and one-third for structures. Annual costs estimated at 10 percent of

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2/ Carter, Deane G., Factory-Built Farm Buildings, Agricultural Engineering, April 1956.

Table 20.- Effects of an additional investment of $1,845 in dairy buildings and equipment on hours of labor required to produce milk on one dairy farm

Item	Dairy buildings and equipment		Annual			
			Milk production		Labor requirements	
	Investment	Capacity	Per cow	Total	Per cow	Total
	Dollars	Cows	100 pounds	100 pounds	Hours	Hours
Before remodeling	4,469	20	97.5	1,950	99.5	1,990
After remodeling	6,314	25	97.5	2,438	57.2	1,430
Change	+1,845	+5	0	+488	-42.3	-560

Economies in Farm Dairy Buildings and Equipment in Relation to Sanitary Quality of Milk. U. S. Dept. of Agr. Agr. Inform. Bul. 153, 1957.

the initial investment in structures and 15 percent for equipment gave a total added cost of $243 per year. If the extra capacity were utilized, annual costs of keeping each additional cow would approximate $275, of which depreciation would account for $30, feed $220, and miscellaneous expenses $25. Offsetting these costs would be an added 488 hundredweight of milk and a reduction of 560 hours in total labor requirements. Sanitary quality of milk and average production of milk would remain uniformly high under both situations.

Even if the extra capacity were not utilized, the remodeling would pay with milk at the usual price of $4 per hundredweight and labor at $0.43 or more per hour. Not measured in this analysis is the difficulty and expense of retaining the stall barn system in a remodeled setup, the extra energy required for such jobs as stooping which cannot be eliminated in a stall barn, the greater flexibility of loose housing, and the loss of income had the operator not been able, financially or otherwise, effectively to remodel the stall barn.

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